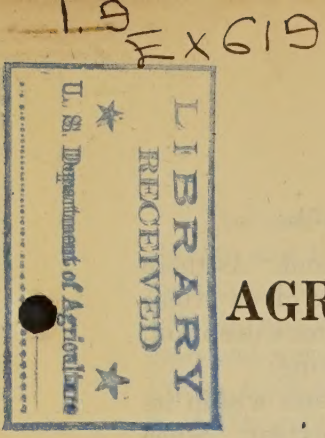


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ALFALFA PRODUCTION.

A LESSON FOR SECONDARY SCHOOLS.

Alfalfa is one of the most popular forage crops grown in the United States. Much has been written for farmers concerning its production. It is the aim of this number of the Monthly to suggest methods and materials for the study of alfalfa in the high school. While the production of alfalfa is becoming important in nearly every State in the Union, in some districts the crop has been grown for years and the students are familiar with the plant in a general way. In such places emphasis will be placed upon special features of cultivation and efficient methods of handling the crop or upon pests of local importance. In sections where the crop has not been tried or is being introduced, more attention will be given the plant itself and its requirements. A somewhat extended list of references is given to enable the teacher to work out a lesson or a number of lessons according to the needs of the students and adapted to the district in which they live.

The treatment of the topics which follow is suggestive of the manner in which the material in a bulletin may be adapted to classroom use.¹

CHARACTERISTICS OF THE ALFALFA PLANT.

It is far better that students study the plant in the field than in the classroom. For convenience, however, a plant may be brought into the classroom. A fresh plant in bloom is the most desirable, but a mounted specimen is better than a picture or written description used alone. Such a specimen may be used to show the ripened seed pods along with the plant in bloom.

The ability of the plant to adapt itself to various climates and conditions should be emphasized. The following paragraph brings out a reason for this ability:

"One of the most important characteristics of alfalfa is its long tap root, often extending 15 or more feet into the soil. This enables the plant to reach stores of plant food in the soil, which can not be secured by the ordinary shallow-rooted field crops. This long tap root is also of great importance in sections of limited rainfall as by this means the plant is enabled to withstand extremes of drought which would otherwise be fatal."

¹ The material in this lesson has been adapted from Farmers' Bulletin 339, Alfalfa. The quoted material is from the same source.

REQUIREMENTS FOR SECURING AND MAINTAINING A STAND OF ALFALFA.

One of the most difficult phases of alfalfa culture is the securing of a good stand. As there are certain requirements to be met in getting a start, each one of these should be given attention. First, it should be emphasized that alfalfa, being a deep-rooted plant, requires a deep soil. The importance of the soil being fertile as well as deep is brought out in the following:

"Alfalfa being a leguminous plant is able, through the nodule-forming bacteria within its roots, to add nitrates to the soil, and in this way increase its fertility to that extent. Since large yields of alfalfa draw on the soil heavily for the other elements of soil fertility, it usually requires the richest and best-drained soil the farm affords, and if successful will bring returns to justify the use of this land. There is risk, however, in selecting bottom lands for alfalfa, both on account of their failure to drain promptly and owing to the danger from weeds on such soils. In the East it is usually best to develop the fertility of some of the higher rolling land and seed this to alfalfa."

Where fertilizers are needed the value and use of barnyard and green manures should be compared with the cost and use of commercial fertilizers.

The necessity for a soil being well-drained and containing sufficient lime should be brought out in the discussion of requirements. While drainage may be treated as a separate subject, the liming of soils may be considered in preparing the soil for alfalfa.

As weeds are more apt to give trouble when establishing the stand than later, the relation of weeds to alfalfa culture may be considered at this time. This subject is closely related to a consideration of crops which may precede alfalfa.

SELECTION OF SEED.

In discussing seed selection the importance of considering the source of the seed, its vitality and its impurities should each be emphasized. When the demand for seed exceeds the supply there is little danger of the seed lacking vitality because of its age, yet a germination test is so simple that it should be made in order that the planter may be sure the seed will grow. It is very important that the seed be free from noxious weeds. Students should be able to detect dodder and other weed seeds commonly adulterating the seed of alfalfa. It will require the use of a lens and some study to detect such seeds as those of sweet clover.

PREPARING THE SEED BED.

The tenderness of the young alfalfa plant makes it necessary to lay special emphasis upon the importance of a thorough preparation of the seed bed. The soil should be plowed deep because the tap root of the young plant soon begins to strike down deep into the soil. The soil should be plowed as a rule about six weeks before planting in order that it may become thoroughly settled. The surface soil should be put into a fine state of tilth for the seeding.

SEEDING.

While the time of seeding varies in different sections the general rule is "to sow as far in advance as possible of what promises to be the most trying season for the young plants." Spring seeding is practical mostly in the West and North and late summer or fall seeding in the East and South.

Alfalfa may be either drilled or sown broadcast. In either case it is usually best to sow half the seed one way across the field and the other at right angles to it. The depth of seeding will depend upon the soil and its condition. An inch and a half may be the necessary depth on sandy soil, less than an inch would be sufficiently deep on a heavy clay.

The rate of seeding will depend also upon the kind of soil and its condition, and upon the climate and the method of seeding. Less seed is required when it is drilled. "The following recommendations as to the rate of seeding are made for the different sections of the country: Atlantic and Southern States, 24 to 28 pounds per acre; States east of the ninety-eighth meridian and west of the Appalachian Mountains, 20 to 24 pounds; semiarid sections of the Great Plains, from 5 to 15 pounds, depending on the average rainfall; 15 pounds is commonly seeded in the irrigated sections by experienced growers."

As the success or failure of using a nurse crop will depend upon local conditions, this subject should be treated from a local point of view.

Likewise the necessity for inoculation will depend upon geographic conditions, as suggested in the following paragraph:

"Throughout the western half of the United States the soil appears to be naturally supplied with the proper bacteria for the formation of the root tubercles. In the eastern part of the country, however, where the soil conditions are less favorable to the growth of these bacteria, it is nearly always necessary to supply them at the time of seeding. This inoculation may be supplied either by scattering soil from a successful field or in the form of artificial cultures."

If the subject of symbiosis in its relation to the power of legumes to enrich the soil has not been discussed previously it may be taken up with profit in connection with the study of alfalfa. A plant with tubercles upon its roots should be used in the classroom, and the students encouraged to make observation of the roots of other legumes. Where inoculation is essential considerable attention should be given this topic, especially in connection with the practical work.

CARE OF THE ALFALFA FIELD.

The discussion of the care of the alfalfa field should bring out the importance of checking weed growth and assisting the plants to make a strong stand the first season. Specific directions will depend upon the time of planting. Subsequent treatment will depend to a great extent upon the climate, nature of the soil, and prevalent pests. Specific instructions concerning the management may be best obtained from local bulletins. Usually little care is needed after a good stand is obtained until weeds begin to prove troublesome. Disking will not only aid in the control of weeds and loosen up the soil, but will also help to thicken the stand by splitting the crowns of the plants, which is a form of propagation. An implement known as an alfalfa renovator, which is essentially a spike-tooth disk, is used successfully on old and weedy alfalfa fields.

IRRIGATION OF ALFALFA.

In the arid regions irrigation is an important feature of alfalfa culture. The management of the field from the preparation of the land to the making of hay is influenced by irrigation. Schools in irrigated districts will find a special Farmers' Bulletin upon alfalfa irrigation very helpful.¹

HANDLING THE CROP.

The greater part of the alfalfa grown in this country is utilized in the form of hay. While only two cuttings are obtained in northern sections and on arid lands, eight or nine cuttings have been obtained from certain varieties under irrigation in the Southwest. Three cuttings may be considered a good average for most sections. Experiments have shown the feeding value of alfalfa to be greatest when cut in early bloom.

Methods of making alfalfa hay and the machinery used in the process vary in different sections of the country. It will be well for the class to study the methods of the most successful haymakers in the section, as well as the suggestions of local bulletins.

¹ U. S. Dept. Agr., Farmers' Bul. 373.

ALFALFA AND SOIL FERTILITY.

So far alfalfa has been considered in relation to its value as a forage crop. It is important to bring out the value of alfalfa in increasing the yield of succeeding crops. The following gives an idea of what alfalfa is worth in its effect on the land:

"Results at the Wyoming Agricultural Experiment Station show that on irrigated land the effect of alfalfa was to increase the value per acre of subsequent crops as follows: Potatoes, \$16; oats, \$16; wheat, \$8 to \$12. The increased gains were made without cost in fertilizing the land, as the alfalfa had been regularly cut for hay for five years. In Colorado and Nebraska the yields of grain are sometimes nearly doubled when immediately preceded by alfalfa."

Alfalfa is not used extensively in short rotations as it is expensive to establish a stand. A stand once established is so profitable that there is a tendency to leave the land in alfalfa as long as it pays well. The student should work out rotations with alfalfa suitable to the district. The following rotation worked out in Ohio will serve as an example: "Alfalfa four years, corn one year, beardless barley sown with alfalfa one year. The cultivated corn crop affords opportunity to destroy any weeds which may have obtained a foothold in the alfalfa field."

PRODUCTION OF ALFALFA SEED.

Inasmuch as there are but limited sections where alfalfa seed is produced, this topic may be slighted or developed fully according to the needs of the community. In sections where seed production is important a Farmers' Bulletin,¹ which treats this subject in a special way, may be used to advantage.

[It will be profitable to raise questions as to where alfalfa seed is produced and which States practice irrigation in the production of alfalfa. In the teaching of agriculture there is abundant opportunity to correlate the work with other subjects and to bring out general information. The wide-awake instructor will not teach subjects merely, but will also use every opportunity to develop his students in a broad way.]

ENEMIES OF ALFALFA.

Alfalfa enemies may be classed under weeds, rodents, insects, and plant diseases. The treatment of this subject will depend altogether upon local conditions. In the East, as a general rule, weeds and diseases are most important, while in arid regions rodents and insects are apt to give most trouble. Some pests such as wild barley and the alfalfa weevil infest restricted districts, while others such as dodder and grasshoppers are more general pests. Those pests which are likely to be introduced should be studied as well as those which are giving trouble. The presence of a pest may modify the general management of the crop to a considerable extent.

PRACTICUMS.

I. For schools having no land:

1. Examination of alfalfa seed for impurities; comparison of alfalfa seed and sweet-clover seed.
2. Comparison of nodules on alfalfa roots with those on some of the clovers.
3. A study of the root system of alfalfa.

II. For schools having a farm or garden:

1. Demonstration of value of inoculation.²
2. Demonstration of value of liming.
3. Alfalfa variety demonstrations.

¹ U. S. Dept. Agr., Farmers' Bul. 495.

² Cultures for inoculation may be obtained from this Department. A recent number of the Department Weekly News Letter states that one planter may obtain two bottles, enough to inoculate 1 bushel of seed. Planters who have had no experience in the use of cultures should write the Department for information and cards upon which to make application for the cultures.

HOME PROJECTS.

1. Small patch in connection with pigs or poultry.
2. Starting and managing one or more acres, a project covering more than one year.
3. Renovation of old field.

COMMUNITY WORK.

1. Organization of alfalfa club.
2. Lectures on alfalfa production.
3. Farm demonstrations.
4. Managing an alfalfa day.

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- Lowther, Granville (editor). *Encyclopedia of Practical Horticulture*. 3 vols. North Yakima, Wash., Encyclopedia of Horticulture Corporation, 1914.
- Stoddart, Chas. W. *The Chemistry of Agriculture*. Philadelphia and New York, Lea and Febiger, 1915.
- Wiley, Harvey W. *The Lure of the Land*. New York, The Century Co., 1915.
- Woll, F. W. *Productive Feeding of Animals*. Philadelphia, J. B. Lippincott & Co., 1915.

HOME PROBLEMS

1. Small child in room, but not at night
2. Small child in room, but not at night
3. Small child in room, but not at night

UNEMPLOYMENT PROBLEMS

1. Unemployment of child
2. Unemployment of child
3. Unemployment of child

THE PROBLEMS OF A FATHER

1. The father's problem is to provide for the family
2. The father's problem is to provide for the family
3. The father's problem is to provide for the family
4. The father's problem is to provide for the family
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